October 16, 2008 TMDL Work Shop Handouts
(Source: Project Plan for Pesticides in the Santa Maria, Orcutt-Solomon, and Oso Flaco Watersheds)
Modified on July 16, 2008

PROJECT AT A GLANCE

Project ID:	711	**Project Name:**	Santa Maria, Orcutt-Solomon, and Oso Flaco Pesticide TMDLs (currently named Santa Maria Estuary Pesticides)
Regional Board:	Central Coast	**Beginning FY:**	2006
Project Type (e.g., TMDL):	TMDL	**Completion Date:**	2019 (per 303(d) list)
Listing Year:	2006	**Priority:**	High
Project Manager:	Katie McNeill	**Phone/Fax Number**	(805) 549-3336 / 788-3553
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Impaired Water(s) Addressed in this Project (attach sheet for more space):

Waterbody Name	Size (miles or acres)	Location (County)	Pollutant(s)
Santa Maria River	51 Miles	Santa Barbara	Chlorpyrifos, DDT, Dieldrin, Endrin, Pyrethroids*
Orcutt Solomon Creek	10 miles	Santa Barbara	Chlorpyrifos, DDT, Dieldrin, Pyrethroids*, Toxicity*
Oso Flaco Lake	56 Acres	San Luis Obispo	Dieldrin

*Not included on 303(d) list but may be included in the Project Analyses

PROJECT DEFINITION

The Santa Maria and Oso Flaco watersheds are located in Northwestern Santa Barbara County and Southwestern San Luis Obispo County, California. The watersheds are about 50 miles north of Point Conception and about 150 miles south of Monterey Bay on the central California coast.

The 303(d) listings include the following: DDT, dieldrin, endrin, and chlorpyrifos in the Santa Maria River; DDT, dieldrin, and chlorpyrifos in Orcutt Creek; and dieldrin in Oso Flaco Lake. The proposed completion date is 2019, suggesting this listing is *low* priority. Staff asserts; however, that the impairment in these waterbodies is severe, and thus should be considered *high* priority.

Staff developed a Project Definition in September 2006. The Project Definition includes an analysis of these constituents in these waterbodies along with other pesticides of concern in associated waterbodies.

In developing the Project Definition, staff evaluated the watershed characteristics, listing basis, applicable water quality objective or criterion and potential numeric targets, available data, and project management components, including development of a recommended management strategy and a working hypothesis regarding the causes of the impairment. The Project Definition for the Santa Maria River Estuary Pesticides Project also included selected components of a Project Charter (from Project Management, 2006). The complete Project Definition is available at the Water Board office, or on-line at http://www.swrcb.ca.gov/rwqcb3/TMDL/documents/santamaria/SMREPestProjDefandChrtDelSept06PDF.pdf

The recommended project is the development of a TMDL for pesticides in the Santa Maria, Orcutt-Solomon, and Oso Flaco water bodies. Staff proposes a timeframe that allows staff to develop the TMDLs in collaboration with related upcoming monitoring activities and current implementation and tracking efforts.

BACKGROUND

The Basin Plan for the Central Coast Region includes water quality objectives to protect beneficial uses. The general objectives for inland surface waters, enclosed bays, and estuaries (Chapter Three, Section II.A.2.a.) that are applicable to this project are as follows:

> Toxicity
> *All waters shall be maintained free of toxic substances in concentrations which are toxic to, or which produce detrimental physiological responses in, human, plant, animal, or aquatic life. Compliance with the objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, toxicity bioassays of appropriate duration, or other appropriate methods.*
>
> Pesticides
> *No individual pesticide or combination of pesticides shall reach concentrations that adversely affect beneficial uses. There shall be no increase in pesticide concentrations found in bottom sediments or aquatic life.*

As described in the Project Definition, numerous efforts demonstrated exceedances of these water quality objectives, and impairment to beneficial uses. U.C. Davis researchers (2004) found water and sediment toxicity in the lower Santa Maria watershed. Chemical analyses and Toxicity Identification Evaluations (TIEs) suggested that water toxicity in Orcutt Creek and the lower Santa Maria River (downstream of the confluence with Orcutt Creek) was due to chlorpyrifos. Additionally, similar evidence showed organo phosphate (OP) pesticides (e.g. chlorpyrifos) and pyrethroid pesticides caused sediment toxicity in Orcutt Creek and the lower Santa Maria River. It was likely the impacts from sediment toxicity were additive because the multiple contaminants present (pyrethroid and OP pesticides) had levels of individual contaminants below published toxicity thresholds. Orcutt Creek appeared to be the major source of toxicity to the Santa Maria River Estuary. Bioassessments showed declines in macroinvertebrates at the same stations with toxicity and high pesticide concentrations. DDT in sediments from the Santa Maria River estuary were among the highest measured in the state according to Downing, J. *et al.* (1998). Pesticide pollution was the likely cause of ecological damage in the Santa Maria River. The Coordinated Monitoring Program (CMP) data collected as part of the irrigated agricultural conditional waiver, showed 100% toxicity at sites throughout the Project Area.

The primary land uses that utilize pesticide applications and drain to the impaired water bodies are irrigated agriculture and urban. Staff determined in the Project Definition that the likely causes of the impairment appeared to be agricultural application of pesticides and residential uses (e.g. for landscaping and urban structural termite control.

The Project Definition analysis suggested that additional analyses and potentially additional data are needed to further understand the relationships (between specific land uses and pollutant loading, and flow and pollutant loading, and chemical concentrations and toxicity) in each of the impaired water bodies. Staff included tasks to review additional existing data mentioned in this report (e.g. sediment, toxicity, fish tissue data) and further characterize the extent of impairment from specific constituents (e.g. dieldrin in Oso Flaco Lake, endrin in the Santa Maria River) in this document.

Staff recommends that TMDLs be developed on a schedule in-sync with existing monitoring grants and related implementation efforts for the impaired water bodies. A Data Analysis Report and subsequent Project Report documents should be developed to address the impairment.

STUDIES, PROJECTS, AND TECHNICAL REFERENCES

This section lists those projects that are related and/or dependent and describes why they are related and/or dependent. It includes efforts inside (Region 3 TMDLs or other region TMDLs) or outside the TMDL Program, permits or other programs within the Water Board, studies by academics agencies or groups that can impact schedule, resources, or strategy for approaching the project. It also includes projects (e.g. implementation actions) that depend on this project for their successful outcome.

This project would be initiated following various data collection efforts and studies (pesticides, toxicity, and bioassessments). CCAMP staff finalized a watershed characterization for the Santa Maria Hydrologic Unit Area. Staff will review this report and incorporate the 2007-08 CCAMP data next fiscal year.

This project would be developed in parallel with implementation of various management efforts. Likely outcomes of this project regarding TMDL implementation will be to rely on two of the Water Board's existing regulatory mechanisms - Phase 2 municipal stormwater NPDES permit and irrigated agricultural conditional waivers (e.g. implementation of measures to manage application and reduce off-site movement of pesticides, integrated pest management practices). Similarly, outcomes regarding measuring progress and tracking water quality improvements will likely rely primarily on two watershed monitoring programs – CMP and CCAMP.

Additionally, use restrictions and cancellations are critical to reduce and eliminate certain pesticides, particularly DDT. The success of this project is dependant upon these efforts. Tracking efforts are occurring as a result of in place regulatory mechanisms, including the Department of Pesticide Regulation's Pesticide Use Reports (PURs) of pesticides such as chlorpyrifos and diazinon. Source assessment and tracking of implementation will rely on this reporting mechanism.

The fecal coliform and nitrate TMDL projects for this watershed are already underway; staff has developed Draft (nitrate and fecal coliform) Project Reports for these constituents. Staff will build on knowledge gained (related to the project area, land use, key stakeholders, management measures, etc…) to develop the TMDLs.

Staff will also rely on methods used and knowledge gained from other pesticide TMDLs in the Central Coast Region and in other Regions (including San Francisco, Los Angeles, and Central Valley) and from other academic entities (e.g. "in press", J. Gan, F. Spurlock, P. Hendley and D. Weston (editors), Synthetic Pyrethroids: Fate and Effects. Amercian Chemical Society, Washington, D.C.)

UC Davis recently received Proposition 50 funding to evaluate farmer practices and collect water, sediment, and fish samples and evaluate for pesticides. The focus of the study includes the Santa Maria River and Orcutt Creek. The project will rely on data collected as part of this effort and staff proposes to augment the grant to better understand agricultural and urban sources, and various chemical contributions to toxicity.

SUMMARY OF PHASES AND ASSOCIATED PLANNED TASKS FOR FYS 2008-09 and 2009-10

Phase 3: Data Collection
3.1 COORDINATE WITH/CIRCULATE KEY COMPONENTS OF FINAL PROJECT PLAN BY STAKEHOLDERS FOR INPUT
3.2: COLLECT DATA: TOXCITY, CHEMISTRY, AND TIEs VIA UCDAVIS CONTRACT

3.3: EVALUATE RESULTS IN CCAMP SANTA MARIA HYDROLOGIC UNIT AREA REPORT (INCLUDE IMPAIRMENT OF WATERBODIES TRIBUTARY TO THE SANTA MARIA BASED ON EXISTING DATA)
3.4: REVIEW CMP DATA AND FOLLOW-UP MONITORING (INLCUDING FEBRUARY 2008 ORGANOPHOSPHATE REPORT) AND LOAD CALCULATIONS
3.5: EVALUATE PROJECT CLEAN WATER DATA
3.6: EVALUATE FLOW DATA
3.7: EVALUATE ADDITIVE EFFECTS OF PESTICIDES
3.8: REVIEW UC BERKELEY STUDY ON CONTRIBUTIONS FROM PYRETHROIDS FROM URBAN AND AGRICULTURAL AREAS AND ASSOCIATED SEDIMENT TOXICITY
3.9 EVALUATE STAKEHOLDER CONCERNS REGARDING PREVIOUS STUDIES AND IMPLICATIONS ON TMDL ANALYSIS, NEED FOR ADDITIONAL DATA COLLECTION, INTERPRETATION OF RESULTS.
3.10 PREPARE DATA ANALYSIS REPORT
3.11 EVALUATE ARCHIVAL DATA AND INFORMATION